IPFS - InterPlanetary File System

- **DApps** need to store/retrieve data in a decentralized manner;

- Ethereum is not free. Saving data on the blockchain is **very expensive** so we need to modify the data storage strategy and save the data off-chain;

- IPFS and Swarm are two popular decentralized, reliable, censorship-resistant, off-chain solutions for data storage;

- **Data (video, audio, documents, etc) will be saved on IPFS,** and on the Blockchain will be saved **only the hash** (as state variable) that uniquely identifies the data on IPFS;

IPFS - The InterPlanetary File System

- InterPlanetary File System (IPFS) is a protocol designed to create a permanent and decentralized method of storing and sharing files;
- IPFS aims to replace HTTP and build a better web;

IPFS Properties:
- IPFS is a peer-to-peer, decentralized, and distributed file system;
- IPFS is a CDN;
- IPFS is also fault-tolerant with zero downtime;
- IPFS is censorship-resistant;
- IPFS uses content address (not location addressing like HTTP)

Content Addressing vs. Location Addressing

- **Location Addressing:**
  - Contents is accessed by location (https://www.servername.com/file.pdf);
  - Whoever controls that location controls the content;

- **Content Addressing**
  - Files aren't anymore accessed based on *"where they are"*, but based on *"what they are"*.
  - There is no location of the files, no one controls the files;

- **Pinning** is the mechanism that allows you to tell IPFS to always keep a given object and never remove it.